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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/576,304

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EXAMINER

MALEK, LEILA

ART UNIT

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2611

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/576,304	<b>Applicant(s)</b> SATO ET AL.	
	<b>Examiner</b> LEILA MALEK	<b>Art Unit</b> 2611	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 13 October 2010.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 12-15, 17, 18, 21 and 22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 12-15, 17, 18, 21 and 22 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 April 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                    | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)         | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 09/15/2010 has been entered.

### ***Response to Arguments***

2. Applicant's arguments filed on 09/15/2010 have been fully considered but they are not persuasive.

**Applicant's Argument:** Applicant argues that the magnitude of a phase change between adjacent data obtained from a subsequent baseband phase signal that follows a first baseband phase signal is not the same as the magnitude of a phase change between adjacent data of the first baseband phase signal.

**Examiner's Response:** Examiner respectfully disagrees. Examiner asserts that Applicant does not provide any disclosure in the specification that the magnitude of a phase change between adjacent data obtained from a subsequent baseband phase signal that follows a first baseband phase signal is not the same as the magnitude of a phase change between adjacent data of the first baseband phase signal. Applicant in the original filed disclosure referred to both magnitudes as "magnitude of phase change

between adjacent data of a baseband phase signal”, therefore the difference between the magnitude values is not clear.

**Applicant’s Argument:** Applicant argues that Johansson only discloses a general idea of closed loop distortion compensation and provides no specific disclosure of the cited limitations of claim 12.

**Examiner’s Response:** Examiner respectfully disagrees. Examiner asserts that Johansson discloses a transmitter comprising a modulator and a power amplifier (see Fig. 2). Johansson discloses a demodulator that demodulates the modulated output signal and generates a second baseband phase signal (see page 686 left column) and a compensator that determines a second phase distortion by performing subtraction between a first baseband phase signal (see the inputs of the system and also subtractors in Fig. 3) and compensates a phase distortion between the first baseband signal and a second baseband signal (i.e., the demodulated signal) with respect to the first baseband signal (see page 686, left column and page 684). At this point, Examiner would like to call the attention of the Applicant to the description of limitation: compensating a phase distortion between the first baseband signal and a second baseband signal based on a magnitude of a phase change between adjacent data of the first baseband phase signal and a predetermined constant, in the specification paragraphs 0038, 0043, and in claim 12. It appears that for finding phase distortion between two signals, the Applicant calculates the phase distortion value by subtracting one signal from the other, and then dividing the result of the subtraction, by the magnitude of a phase change between adjacent data of the first baseband signal,

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saving the obtained value as a constant, and then multiplying the constant by the magnitude of the phase change between adjacent data of the first baseband signal. A closer examination of this formula reveals that the phase distortion value is first divided by a number (i.e. the magnitude of phase change) and then multiplied by the same number. Since these numbers actually cancel each other out, they do not have any effect on the final result of the phase distortion. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Johansson and alternatively divide the phase distortion value by number X to obtain a constant and even save the constant in a memory for further processing and then read the constant from the memory and multiply it by X to obtain the same results. Johansson discloses that the phase distortion value can be calculated by subtraction of the first signal (see Fig. 3) and the second signal. Therefore, the apparatus (compensator) disclosed by Johansson has the same functionality of the compensator cited by the Applicant in claims 12, 21, and 22. It would have been obvious to one of ordinary skill in the art at the time of invention to modify Perrett's teaching as suggested by Johansson, before modulating the signal, to compensate for drifts in power amplifier nonlinearities caused by temperature changes, DC power variations, load changes (see page 686).

***Claim Rejections - 35 USC § 112***

3. Claims 12-15, 17, 18, 21, and 22 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the

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application was filed, had possession of the claimed invention. As to claims 12, 21, and 22, Applicant in the original filed disclosure fails to disclose compensating the subsequent first baseband phase signal. Furthermore, as to claim 18, Applicant in the original filed disclosure fails to disclose “using the subsequent first baseband phase signal compensated by the compensator”. Claims 13-15, 17, and 18, depend on claim 12; therefore they are rejected as well.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 12-15, 17, 18, 21, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Perrett et al. (hereafter, referred as Perrett) (US 6,018,275), in view of Johansson et al. (hereafter, referred as Johansen) (Linearization of Multi-carrier Power Amplifiers, Vehicular Technology Conference, 1993 IEEE 43rd; 18-20 May 1993, pages: 684-687.

As to claims 12, 21, and 22, Perrett shows a communication apparatus (see Fig. 4, i.e. a transmitter) comprising a modulation apparatus (see Fig. 4, block 30) comprising: a modulator (see block 39) that modulates a frequency converted signal (see the output of block 36) by a first baseband phase signal (see signal  $f_{bb}$ ) and generates a modulated signal (see the output of modulator 39); a phase comparator (see block 33) that determines a phase distortion (interpreted as a first phase distortion)

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between a phase of the modulated signal and a phase of a reference signal; a voltage control oscillator (see block 34) that generates an oscillation frequency as a modulated output signal, the oscillation frequency determined by a control signal (i.e. the output of filter 38) indicating the phase distortion found in the phase comparator; a frequency converter (see block 36) that converts a frequency of the modulated output signal generated by the voltage control oscillator and generates the frequency converted signal. Perrett discloses all the subject matters claimed in claims 12, 21, and 22, except for a demodulator that demodulates the modulated output signal and generates a second baseband phase signal; and a compensator that determines a second phase distortion by multiplying a magnitude of a phase change between adjacent data obtained from a subsequent first baseband phase signal that follows the first baseband signal, by the constant stored in the storage, compensates the subsequent first baseband phase signal using the determined second phase distortion, and outputs the compensated subsequent first baseband phase signal to the modulator, wherein: the constant is determined by dividing a third phase distortion by one of a magnitude of a frequency change per unit time of the first baseband phase signal and a magnitude of a phase change between adjacent data of the first baseband phase signal; and the third phase distortion is a difference between the first baseband phase signal and the second baseband phase signal. Johansson discloses a transmitter comprising a modulator and a power amplifier (see Fig. 2). Johansson discloses a demodulator that demodulates the modulated output signal and generates a second baseband phase signal (see page 686 left column) and a compensator that determines a second phase distortion by

performing subtraction between a first baseband phase signal (see the inputs of the system and also subtractors in Fig. 3) and compensates a phase distortion between the first baseband signal and a second baseband signal (i.e., the demodulated signal) with respect to the first baseband signal (see page 686, left column and page 684). At this point, Examiner would like to call the attention of the Applicant to the description of limitation: compensating a phase distortion between the first baseband signal and a second baseband signal based on a magnitude of a phase change between adjacent data of the first baseband phase signal and a predetermined constant, in the specification paragraphs 0038, 0043, and in claim 12. It appears that for finding phase distortion between two signals, the Applicant calculates the phase distortion value by subtracting one signal from the other, and then dividing the result of the subtraction, by the magnitude of a phase change between adjacent data of the first baseband signal, saving the obtained value as a constant, and then multiplying the constant by the magnitude of the phase change between adjacent data of the first baseband signal. A closer examination of this formula reveals that the phase distortion value is first divided by a number (i.e. the magnitude of phase change) and then multiplied by the same number. Since these numbers actually cancel each other out, they do not have any effect on the final result of the phase distortion. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Johansson and alternatively divide the phase distortion value by number X to obtain a constant and even save the constant in a memory for further processing and then read the constant from the memory and multiply it by X to obtain the same results. Johansson discloses



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that the phase distortion value can be calculated by subtraction of the first signal (see Fig. 3) and the second signal. Therefore, the apparatus (compensator) disclosed by Johansson has the same functionality of the compensator cited by the Applicant in claims 12, 21, and 22. It would have been obvious to one of ordinary skill in the art at the time of invention to modify Perrett's teaching as suggested by Johansson, before modulating the signal, to compensate for drifts in power amplifier nonlinearities caused by temperature changes, DC power variations, load changes (see page 686).

As to claim 13, Perrett and Johansson disclose all the subject matters claimed in claim 12, except that the compensator transforms the magnitude of the phase change between adjacent data obtained from the subsequent first baseband phase signal into a magnitude of a frequency change per unit time of the subsequent first baseband phase signal, and determines the second phase distortion using the magnitude of the frequency change per unit time obtained by the transformation and the constant stored in the storage. However, since phase and frequency are related to each other, it would have been obvious to one of ordinary skill in the art at the time of invention to alternatively use the magnitude of the frequency change instead of the magnitude of the phase change in phase distortion calculations (for instance finding the phase distortion using the magnitude of the frequency change), to obtain the same results. Again a closer examination of this formula reveals that the phase distortion value is first divided by a number (i.e. the magnitude of frequency change per unit time) and then multiplied by the same number. Since these numbers actually cancel each other out, they do not have any effect on the final result of the phase distortion. Therefore, it would have been

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obvious to one of ordinary skill in the art at the time of invention to modify Johansson and alternatively divide the phase distortion value by number  $X$  to obtain a constant and even save the constant in a memory for further processing and then read the constant from the memory and multiply it by  $X$  to obtain the same results. Johansson discloses that the phase distortion value can be calculated by subtraction of the first signal (see Fig. 3) and the second signal.

As to claim 14, Perrett and Johansson do not disclose a storage that stores the constant obtained by dividing the phase distortion by the magnitude of the frequency change, however, it would have been clearly recognizable to one of ordinary skill in the art at the time of invention to use a storage to save any calculated value in the system for further processing that value. The limitations regarding obtaining the phase distortion by multiplying the magnitude of the frequency change by the constant has already been addressed by the Examiner in rejection of claim 12 and 13.

As to claim 15, Perrett and Johansson do not disclose a storage that stores a constant and its associated magnitude of the frequency change per unit time, however, it would have been clearly recognizable to one of ordinary skill in the art at the time of invention to use a storage to save the calculated values in the system for further processing those values. In order to obtain an accurate phase distortion value the compensator should choose the right magnitude of the frequency change per unit time which has been used previously to obtain a constant value and multiply that value by the constant. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to save the constant value with the magnitude of the frequency

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change used for calculating that constant value in a memory to facilitate the phase distortion determination process.

As to claim 17, Johansson discloses that the demodulator generates the second baseband signal and demodulates a received signal (see Fig. 3 and page 686).

As to claim 18, Johansson discloses that the modulator modulates a carrier signal using a first baseband signal (see page 686, left column, lines 1-6) compensated by the compensator 108 and generates the modulated signal.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LEILA MALEK whose telephone number is (571)272-8731. The examiner can normally be reached on 9AM-5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on 571-272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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